

inorganic chemistry to substitute Cd or Hg for Zn, and Br, I, or F for Cl in doping the Cu and Se atoms, respectively, in a CuInSe₂ based thin film material. Further, a minor amendment has been made to the specification to reflect deletion of all the possible group II(a,b)-group VII salts and with substitution therefor of the group IIb halides. Claim(s) 1-11 remain in the application. Reexamination and reconsideration of the application, as amended, are requested.

Claims 1-11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Pollock in view of Basol. Applicant respectfully traverses the Examiner's rejection on this ground. The Examiner states that Pollock teaches a similar method for producing photovoltaic devices. In point of fact, Pollock teaches the traditional approach of depositing a zinc hydroxide buffer layer. The present invention is aimed at avoiding the use of buffer layers (on page 4, line 9 to 10) by type converting the p-type upper copper indium diselenide film surface. Neither Pollock nor Basol so much as suggests extrinsic doping of the p-type upper copper indium diselenide film surface to form an n-type junction using thermal diffusion of a group IIb halide into the copper indium diselenide film of the device present in Applicant's claim 1. The absence from a reference of an explicit requirement of Applicant's claim cannot reasonably be construed as an affirmative statement that the requirement is in the reference such that a finding of prima facie obviousness is appropriate. In re Evanega, 829 F.2d 1110, 4 USPQ2d 1249 (Fed.Cir. 1987).

Regarding claim 1, the Examiner contends that Basol teaches similar photovoltaic device manufacturing methods where an equivalently disclosed salt is thermally diffused for the same purposes and suggests the use of zinc chloride (col. 5-6 and example 2). The Examiner further states that it would have been obvious to one having ordinary skill in the art to use a "dry" zinc chloride annealing step to perform thermal diffusion of a salt taught by Basol for the same intended use in the method taught by Pollock because of the similarities in methods, utilities, and

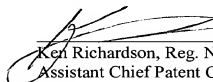
photovoltaic devices along with the expectation of similar results. Applicant respectfully traverses the Examiner's rejection on these bases. Basol discloses an annealing step whereby a Te containing layer and a Cd, Zn, or Hg containing layer are annealed in the presence of cadmium chloride (Example 2) onto a cadmium sulfide film for the purpose of forming a group IIb metal-telluride film and a rectifying junction, in situ, between the cadmium sulfide and the Group IIb metal-telluride layer which has been formed. However, neither Pollock nor Basol so much as suggests thermal diffusion of CdCl_2 as an extrinsic dopant into a CdS surface of a CdS/CdTe device structure to fabricate the high efficiency thin film solar cell present in Applicant's claim 1. As disclosed by Applicant, the thermal diffusion of zinc chloride into the CuInSe_2 surface is for doping the p-type CuInSe_2 upper surface n-type and thereby forming a cadmium free (non-CdS) junction resulting in a high efficiency cell. Thus, Applicant respectfully disagrees with the Examiner that Pollock and Basol sufficiently disclose Applicant's invention such that a finding of obviousness is warranted.

Regarding claim 1, the Examiner states that it would have been obvious to one having ordinary skill in the art to use a dry zinc chloride annealing step to perform thermal diffusion of a salt taught by Basol for the same intended use in the method taught by Pollock because of the similarities in methods, utilities, and photovoltaic devices along with the expectation of similar results. Applicant traverses the Examiner's rejection on this ground due to the fact that, as discussed above, the Pollock and Basol disclosures, either independently or in combination, could not possibly produce the device as disclosed in claim 1.

In view of the above, it is submitted that the claims are in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested. Allowance of claims 1 -11 at an early date is solicited. Applicant further requests that the Examiner contact the undersigned should there be any questions or comments about the foregoing.

Respectfully submitted,

Dated: March 11, 1999



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